White Paper

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Discovery and Documentation of At-Risk Built Heritage
Crowd-sourced, open-source, low-cost digital recording through local knowledge

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Introduction

The Issue

Our personal lives and memories are shaped by and coexist within a backdrop of our collective built cultural heritage. At all scales and across the world, our built heritage is at significant risk of damage or permanent loss. The causes of loss are many: wars and internal conflicts, violence by intolerant groups, weather, climate change, natural disasters, prolonged lack of maintenance, and development pressures. Typical approaches to heritage preservation are frequently limited to only the most significant and high-visibility places which are chosen by experts. This limitation results in a significant number of lower-visibility but locally important places being lost every year due to a variety of factors such as development pressures, deferred maintenance, natural disaster, war/ terrorism, and others. These lower-visibility but locally important places are not likely to have much, if any, documentation. It is also unlikely that local communities have had any significant voice in the preservation process. Conversely, high-visibility places are likely to have preservation support from experts and robust documentation. When damaged, they are likely repaired, restored or reconstructed. Low-visibility and locally important places are not likely to have preservation support or documentation. When damaged or destroyed, they are lost forever.

Not Our Focus:

High-Visibility, Low-Risk

High-visibility places are likely to have preservation support and robust documentation. When damaged they are likely repaired, restored or reconstructed.

Sungnyemun: Reconstructed after arson.

Our Focus:

Low-Visibility, Medium/ High-Risk

Low-visibility locally important places are not likely to have preservation support or documentation. When damaged or destroyed they are likely lost forever.

St. Dominic's Church: Lost to development pressures.

Our Focus:

Low-Visibility, Medium/ High-Risk

Low-visibility locally important places are not likely to have preservation support or documentation. When damaged or destroyed they are likely lost forever.


Berkeley Pier: Lost to lack of maintenance.

Background

The concept of low-cost and community-based recording of built heritage was presented in a paper at the International Conference on Virtual Systems and Multimedia dedicated to Digital Heritage. In 2011 and 2012, a prototype of the website was created. Students at the University of San Francisco Department of Art & Architecture carried out the recording of several heritage sites to test and provide feedback on the first functional proof of concept web application. This prototype served as the foundation for our project "Discovery and Documentation of At-Risk Built Heritage," which received The National Endowment for the Humanities Digital Start-Up Grant Level II grant award in the fall of 2015.

Our Solution

Through our project titled "Discovery and Documentation of At-Risk Built Heritage," made possible with funding from The National Endowment of the Humanities Digital Start-Up Level II grant and the University of San Francisco, we developed the PlaceRoots platform. PlaceRoots is a web/ mobile application, that uses the power of crowdsourcing to leverage local knowledge in order to aid in the discovery and documentation of at-risk built heritage. The PlaceRoots platform provides a central place for people and communities to collaboratively share information in order to raise awareness and visibility for important places that are in danger of being damaged or lost.
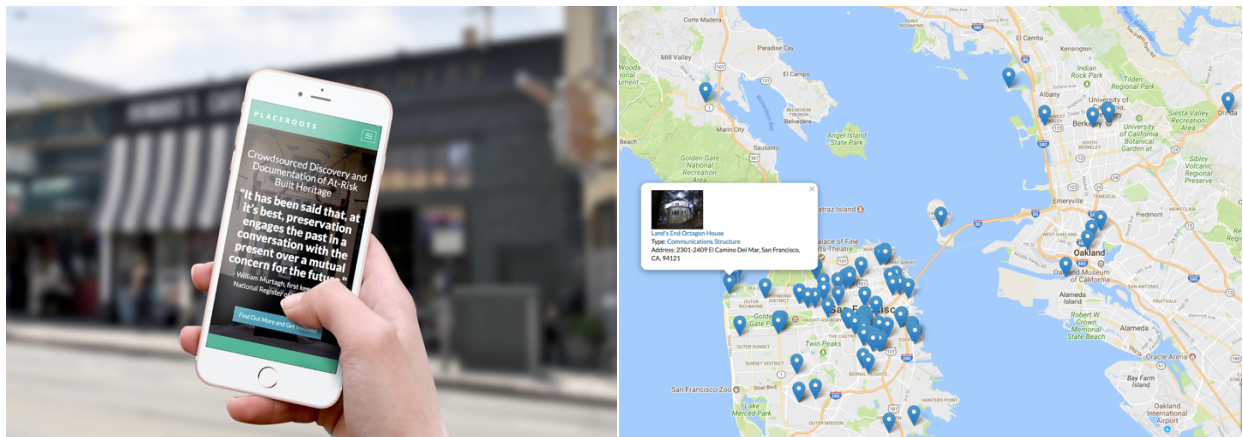
Top-Left: Illustration of PlaceRoots on a mobile device
Top-Right: Map view of places that have been added to the PlaceRoots platform

Any member of the public can contribute to the PlaceRoots database either by adding new places or contributing information to places already in the database. For each place (building or site), a central record is created on the PlaceRoots platform. This central record is referred to as the place's profile. Each place profile grows in breadth and depth as more people contribute information in the form of attributes, photos, videos, importance ratings, risk assessments, comments, stories, and news articles among others.

The data that can be recorded for each place consists of the following primary elements:

- Place name
- Geographic location
- Place type (building or site type)
- Year built/ established
- Architect/ developer
- Architectural style
- Current status
- Risk assessments (multi-factor)
- Importance ratings (multi-factor)
- Imagery (photographs, panoramas and videos)
- 3D Models (photogrammetry - derived from photographs and/ or videos)
- Historical records
- News and blog articles
- Personal/ cultural narratives
- Audio interviews/ clips

The data in each place profile is updated in real-time and openly accessible for community and preservation groups, government agencies and universities to utilize for research, preservation efforts and for posterity. At regular intervals, PlaceRoots staff and volunteers conduct verification screenings of the crowd-sourced content within place profiles. All data in a profile, that can be verified, will then be copied to a curated digital collection housed within the Gleeson Library at the University of San Francisco. The verified digital collections will be openly available to all other institutions for research.

The PlaceRoots platform leverages the following three concepts:
- Crowdsource data in order to tap into and amplify local knowledge
- Collect data using widely available and low-cost tech
- Open-source and open-access internet-based platform

Long-Term Goals
- Discover and document places outside of the scope of prevailing preservation approaches
- Increase the quantity and breadth of all built heritage sites that are documented
- Democratize the process by bringing in the voice of all community members
- Provide open access to all data for the general public, government agencies and research activities
- Be a resource for preservation efforts
- Be a community resource

Project Activities

During the period September 2015 to June 2017, our NEH Digital Humanities Start-Up Level II, Digital Humanities Grant ($60,000), supported research, application development and workshop activities to develop and test an innovative platform and approach to crowdsourcing data about at-risk built heritage. The results of which would be a cache of data about

threatened and little known built heritage which would be catalogued, stored and made widely accessible.

We successfully completed all activities defined in the project's work plan as well as completing several additional activities and enhancements which positively boosted the outcomes of our project.

The ultimate vision for the platform we have developed, is for it to become a sustaining, user-driven global infrastructure for the discovery and documentation of at-risk built heritage. With the successful completion of our work plan activities, as well as additional activities and enhancements, we can say that we have significantly advanced the direction of this ultimate vision.
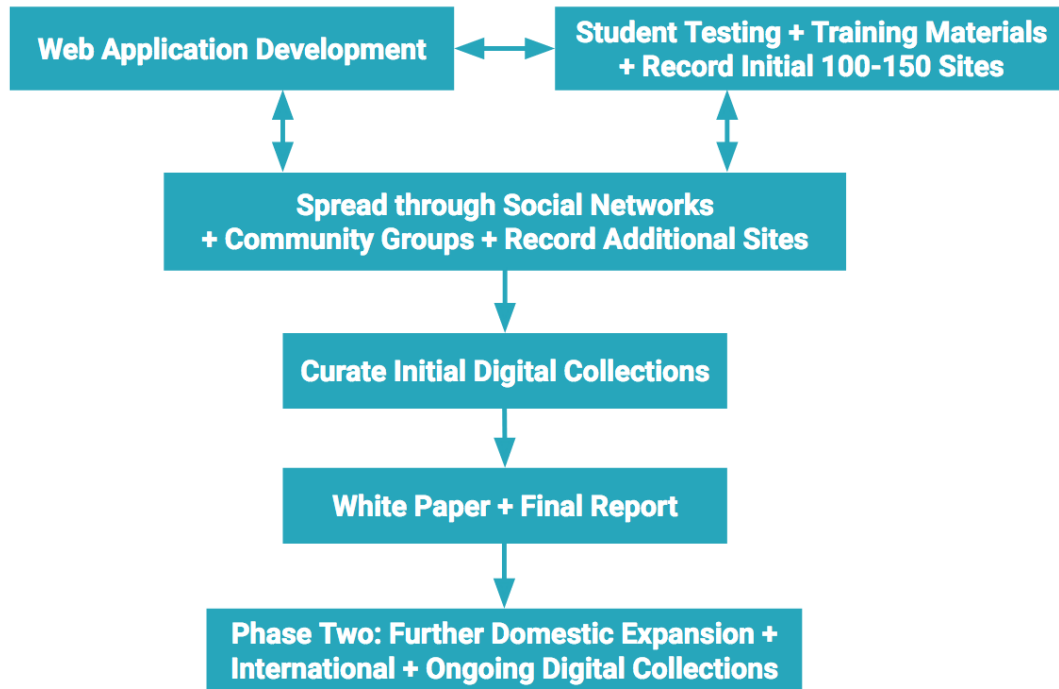
Project work plan activities completed:
- Recruitment of initial volunteer researchers, via personal contacts and social networks
- Prototype basic website and workflow, installation and training
- Workshop to assess prototype and volunteer training (completed multiple assessments)
- Website updates for project functionality
- Website visual design and user interface updates (completed multiple iterations)
- Training materials for Recording
- Remote training of initial 10 volunteer recorders
- Add keyword search capability
- Initial records from field researchers
- Processing of field data
- Recruitment of additional volunteers
- Mobile device recording functionality
- 3D model restitution
- Field data from 100 to 150 sites (collected data for over 125 sites)
- Field data using Mobile devices

Additional major activities and enhancements completed:
- Platform re-branding from Recording Heritage to PlaceRoots in order to make the platform more appealing to the general public
- Redevelopment of the initial prototype core code/ application and user interface
- Significantly increased the type and variety of data collected for each place
- Survey system for multi-factor rating of a place's importance and risk factors
- Enhanced sorting, filtering and searching of data records based on expanded data being collected
- Addition of drone still and video recording and modeling to extend visual access to areas not visible from ground level or street
- 3D model restitution from drone based photos and videos

- Admin dashboard and system for data verification process prior to transfer to Digital Collections
- User dashboard

To successfully complete the work plan in phase one (NEH Start-up grant period) of our project we followed the flow diagram below.

Above: Project work plan flow diagram

Many of our work plan activities benefited from an iterative process. After significant activities or milestones were reached they were re-assessed and tested with volunteers who then provided feedback. Volunteer feedback was then incorporated into future iterations of a feature, process or activity that was being developed on the PlaceRoots platform.

During our grant period, we made changes to the roles and/ or timing of involvement by key personnel. These changes improved productivity and content quality and did not have any detrimental impact on to the project. The one impact was a time extension of six months due to a key team member's maternity leave.

Accomplishments

All project objectives proposed in the original application were accomplished except the deployment of extensive social media recruitment, retention testing and parallel resource development with Gleeson Library. All the proposed technological advancements and web-based structures were accomplished and these were expanded significantly beyond original application goals during the grant period.

Examples of where the research process took us beyond the original scope of the project are:

- Drone photographic recording of inaccessible parts of buildings and sites
- Drone video recording of inaccessible parts of buildings and sites
- Use of Photogrammetry in establishing 3D views of buildings
- User driven risk and importance surveys
- Outreach to preservation nonprofits seeking visuals and online platforms for preservation efforts
- Blog development to highlight specific sites, including oral histories of users and former users of sites
- Video recording of walkthroughs to augment street view imagery
- Dynamic and robust website developed and fully useable online

Deployment of extensive social media recruitment and retention testing were postponed as it became clear that such networking demanded a more robust platform that encouraged and rewarded participation. It was determined that ease of use, enjoyment of use, and engaging online activities and discussions, needed to be embedded in the platform if there was to be ongoing engagement and retention of users beyond one try per user. If we had initiated social media recruitments of users too early, the lack of interest beyond the first look, would have depleted the social network resources of the team, thereby drying up the critical starting point of the social media recruitment effort.

We have also re-envisioned the parallel archiving effort at the Gleeson Library. As a result of significant improvements and expansions on our platform, the volume and variety of content that must be reviewed and approved prior to transfer to the library has grown significantly. To deal with the greater volume and complexity of data in the curation process, we have created a framework for a back-end library administration dashboard on our platform. The dashboard will allow for in-depth review and approval of user contributed content for accuracy, copyright and proper attribution prior transfer to the library collection in a semi-automated and time efficient manner.

The end of the grant period now has the website fully functional, robust and user friendly. There are also multiple features offered on the platform that would be of interest to a greater variety of users. The team is now ready to launch the networking effort to fully test the dynamics of both high-volume use and administration, and the effectiveness of social media networking.

Initially, this next phase will be conducted by the principal investigators in conjunction with university classes in the Architecture and Community Design program at the University of San Francisco. There are two primary, upper division courses that will be utilized. Community Design Outreach is a senior capstone studio, where students work in team of social and environmental justice projects for community partners and on faculty directed, independent

research projects. The social media testing of the Recording Heritage/PlaceRoots project will be one of the primary projects of the term. This course extends into the spring term for new and continuing students in the course, International Projects. Both courses have syllabi that fit the scope of this project effort. The second course direction is GIS mapping, where we can test the systems capability in identifying and locating heritage sites, as well as tracking users and site traffic.

The cost is minimal for continuing this research through university coursework by faculty guiding students. One of the primary benefits of this grant, was to enable the investigators the time and funding to develop a robust enough online recording platform to be able to use it as a tool for low cost recording of threatened, architectural heritage sites. The expected completion date is the end of the next academic year in late spring 2019.

Audiences

Any person interested or concerned about heritage sites anywhere in the world, was the audience for this project. The only requirement was that participants had access to either a smartphone with camera capability and/or a computer with internet access. Individuals wishing to observe or participate came from a range of geographic areas, gender identifications and ages.

Underserved audiences who were most interested came from self-described neighborhoods and regions with threatened heritage sites. The most common were U.S. based individuals and groups located in the Northeast and Northwest. There was also individual interest in smaller scale preservation of cultural icons, such as historic neighborhood cafes, bookstores, entertainment venues and artisan enclaves. The latter category was equally interested in recording of oral histories, as they were with visual recording, as they viewed the two as both compatible and mutually reinforcing. This user group was prevalent enough for the Authors to initiate a parallel project track to test the recording of oral and visual histories of threatened historic sites, and to include them as podcast links on the Recording Heritage/PlaceRoots website platform.

Additional underserved audiences were from war-torn and long-term conflict regions such as Syria, specifically Aleppo, and Cyprus. In these cases, the challenges and dangers connected to any collection of imagery, was such that we could not initiate data collecting during the grant period. However, we do have active plans to find ways to do the recording in the future as our research broadens beyond the development and testing phase. The Cypriot example is one where there is active investigation of requirements for access permission from the U.N. and others. The other underserved audiences that came to the fore were threatened historic "Gingerbread" houses in Haiti and rubble stone villages in Nepal, as well as the deteriorating Forestiere Underground House in Fresno, CA.

Evaluation

Evaluation has been ongoing internally for the duration of the grant and continues during the post grant period.

The results of continual self-evaluation and assessment resulted in continual refinement of the needs of the project. This active reassessment, enabled the team to streamline the process of recording, collecting and archiving of data, as well as greatly expanding the range, technical methods, and approaches to collection. The result has been the development of a more robust and comprehensive product than was proposed or anticipated by the original proposal.

Problems Identified in Early Evaluations
- Website appearance that inhibited user interest
- Ease of signing up as contributor
- Ease of uploading photos and text information to website
- Ease of data searches
- Lack of website strategies to hold user interest in exploring website content
- Lack of partnerships with historic preservation and other interest aligned entities
- Limited access to recording opportunities to facades and not entire buildings or sites (drone use)

Public Response
Public response was positive across the board. Without exception, all participant recorders, users, and interested parties found the *Recording Heritage/ PlaceRoots* concept and interactive website a culturally important tool, worthy of broader public awareness, distribution and use. We were approached by one of the largest software companies in the Architecture, Engineering and Construction (AEC) industry and have had multiple meetings with them where they have expressed their desire to help us spread the word about our work.

The positive public response has been highly encouraging and clearly supports the view that there is a lack of related platforms available and that there is continuing potential for high use and visibility of the *Recording Heritage/ PlaceRoots* platform.

Continuation of the Project

The team is continuing the *Recording Heritage/ PlaceRoots* project after the grant period. We are actively recruiting a new set of university student volunteers as well as from alumni networks via a Facebook page. Additionally, the principal investigator is exploring partnerships with VR/AR entities to expand the quality of heritage recording of sites deemed highly vulnerable and/or of public interest. Collaborative ventures with municipal entities, such as heritage-rich rural counties, are also being pursued. This is both to develop interesting, underrepresented content and to offer such public administrations access to the powerful tourism potential that the PlaceRoots website offers. The interest shown by such entities supports the exciting and unexpected notion that economic benefits from tourism could be

derived from this project, while helping preserve physical heritage sites. The expectation is that embedding professional level of recording from VR/AR and municipal economic development participation, with the general content, will increase interest from word-of-mouth users, surfing users, and our own intentional recruitment through social media platforms.

Grantee Institution Commitment

USF Gleeson Library, the grantee institution, is to partner in developing a parallel interactive database to the PlaceRoots.org website. While the .org site is available for active and open use by the general public, the university database will be focused primarily on academic research, student and faculty access for teaching and research purposes. A primary team member is the digital librarian for Gleeson Library, who, with the primary investigator for this grant, has a 10 plus year collaborative relationship building and populating an internal archive of architecture related student work, both theoretical and real world-based. The interest and commitment are there, as is the experience and relatable structure to already existing digital archiving methods being used.

Collaborative Partnerships

This grant period yielded multiple collaborative partnerships and a number of avenues toward which will likely yield additional partnerships. Primary among partnerships formed are with U.S. based historical societies in Philadelphia, Portland, and the Fillmore and Bayview districts in San Francisco. Internationally, early partnerships were formed with historic preservation groups in Nicosia, Cyprus, in Leon, Nicaragua, and Port au Prince, Haiti.

University connections have been expanded to this area of investigation with the University of Oregon, Portland, University of Southern California, Northwest University, and the University of New Mexico.

Discussions have also begun with domestic nonprofits in Pennsylvania, Oregon, California, and NGOs in Nicaragua, Haiti, and Cambodia.

These fledgling partnerships will only get stronger as the investigative team pursues recording opportunities tied to the interests of these partners. Initial identification of "places of interest" have been noted and are being elaborated, with first recordings being planned as a way to solidify these newly formed relationships. As with this NEH Digital Humanities Start-Up Level II Grant, the investigative team plans to continue utilizing and leveraging university students in the development and expansion of the recording process. The primary investigators of this research team teach five separate courses during the academic year, which engage students in real world projects working with local and underserved communities. Each faculty intends to introduce an element of this project into each of those five courses, thereby engaging dozens of students in related activities. The intention is that these students will engage further numbers of participants through their work on the community-based projects, which by their nature are interactive and participatory.

Long Term Impact

Long-term impacts are many. In the area of local and international partnerships, the team is engaged with a number of active partnerships that did not exist prior to the grant period. The use of drone technology as a research and recording tool is now a standard with the investigative team. The current effort to partner with VR/AR team to do high level recording of At-Risk heritage sites is a direct result of the project.

Funding from the grantee institution for the purchase of needed equipment and technology has come as a result of this project. The project's success has helped justify further activities which the researchers have confidence will continue to garner support from the university.

Funding relationships with for-profit AR/VR companies, as well as filmmakers, podcast and broadcast media are also being discussed as a way of funding continued development of the project and expanding into other realms of public dissemination and access.

Institutional Perception

The project has had a number of positive impacts on outside perception of the grantee institution. There is more awareness that the university has an architecture program with an area of focus on physical heritage and historic preservation. This has resulted in a number of inquiries, through user interaction with the website, where the principal investigators have been contacted about application to and enrollment at the university. The project has unexpectedly acted as a recruitment tool. Additionally, through awareness of the research platform for this project, IT developers have engaged the principal investigator in partnering to assist in the development of a novel internet search engine. This relationship has significant research and practical applications beyond the expectations of the principal investigator and has spawned new areas of research that will be made possible by the development of these new technologies.

Grant Products

A robust, accessible, easy to use, and data filled website (https://www.placeroots.org) was the primary grant product from this project. This was one of the primary goals of the project, so the investigative team considers this a huge success of the project.

A three-episode oral history podcast series was created and is pending publication.

A Twitter feed (@placeroots) is established with 33 followers and 247 following.

Placeroots has an active Facebook page at https://www.facebook.com/placeroots/

PlaceRoots is active on Instagram at https://www.instagram.com/placeroots/ with 50 followers and 143 following.

A paper is planned to describe the innovative technical foundation of our platform. The purpose of this paper is to benefit other institutions and disciplines who may wish to develop a similar platform.

The grant's website product was displayed as an interactive exhibit in San Francisco's Thacher Gallery in May 2017 and will again be exhibited in the Community Outreach exhibition at the University of San Francisco in May 2018.